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In a word the final *proof* of qualitative identity of phenomena must always in last analysis be qualitative in its nature; quantitative evidence in such cases can at best have but an inferential confirmatory bearing on the qualitative point at issue.⁹

RAYMOND PEARL.

EXPERIMENTAL ZOOLOGY

Are the Drone Eggs of the Honey-Bee Fertilized? Cuénot¹ has put to the test once more Dzierzon's famous theory in regard to the nature of the drones of the hive bee. Dzierzon, as is well known, furnished strong evidence in favor of the view that the egg that produces a drone is not fertilized. An obvious test of this view is found in crossing a virgin queen of one race by a male of another race. All of her worker offspring should be hybrids but her drone offspring should be purely maternal in character. It is said that the failure of one such experiment to give the expected results caused Dzierzon to abandon temporarily his theory. Other workers too have from time to time found that the drones in such cases sometimes show hybrid characters and this argument has been repeatedly urged against Dzierzon's theory despite the large amount of evidence of a different kind to the contrary.

Cuénot crossed a virgin female of the black or Italian bee of pure race with a "yellow bee" also of pure race. All the workers produced showed the yellow bands of the yellow parent; some 300 drones were black like the mother, two only showed a large yellow band at the top of the abdomen (recalling the more numerous yellow bands of the yellow bee), and about a dozen other males also showed some yellow bands on the abdomen. "Do those yellow bands indicate hybridization?" Such bands were never found in the males of neighboring hives. The experiment is inconclusive, Cuénot says, but it shows the necessity of examining not only the purity of the pure races but also the extent of their variation. The possibility that these few hybrid males may have arisen from eggs laid by the hybrid workers is not considered by Cuénot but until this possibility is also excluded the results can not be maintained to show the hybrid nature of the drones except in the latter sense. If the males

⁹ Cf. the discussion regarding the simple logarithmic growth curve on p. 304, *supra*.

¹ Cuénot, L. *Comp. Rend. Soc. Biol.*, LXVI, 1909.

have arisen as here suggested from the eggs laid by the hybrid workers the fewness of such individuals in comparison with the large number of pure males is explained. On the other hand the apparently well established view that drones come from unfertilized eggs does not exclude the possibility that fertilized eggs might also under certain exceptional conditions produce males.

T. H. MORGAN.

THE UPHOLDING OF DARWIN

Poulton and Plate on Evolution.—The boundary lines of political geography are supposed to have no influence in determining scientific beliefs. In science one is cosmopolite. But hedged in by a nation's boundaries is a people of one blood, men of a common genealogy, and hence of some identity of hereditary endowment. It may not be so easy, therefore, for an Englishman to be French in scientific tenets as he may imagine. The coincidence that the majority of conspicuous English biologists, such men as Wallace, Galton, Lankester, Archdall Reid, Edward Poulton and others, hold so strongly to the natural selection dogma, and, except for the German founder of the school, are the most outspoken upholders of neo-Darwinism, may be indeed more than a coincidence. It may be unconscious scientific patriotism. And so in France, there is no question of the strong leaning of present-day French biology toward Lamarckism. How much more pitiful, in the light of this fact, let us add, seem the neglect and contempt of the great French evolutionist in his lifetime by his Gallic colleagues! But he has now his reward. Scientific patriotism is bringing his name and his teaching to be the glory of French biology.

I would not press my theory too hard. As Weismann is the founder of neo-Darwinism the Germans ought to be neo-Darwinists, but they mostly are not; and as Haeckel is a monist, they ought mostly to be anti-dualists, but again they mostly are not. Also, as America is more Anglo-Saxon than Latin, we ought to be more Darwinian than Lamarckian, but we are not. So my theory, like many another of even greater plausibility, but ill stands hard wear. Even in England there are men who see other factors in evolution than natural selection, and to tell the truth these men in the minority are after all the truer upholders of scientific patriotism, for like them Darwin also saw